Accelerometer Accessories:
CXLDK Digital Interface Card

Simple Digital Interface for Crossbow Accelerometers

Plugs into any RS-232 Port

38.4KBaud, 200Hz Sampling Rate

Quickly Utilize Accelerometers for Vibration, Tilt, and Inertial Measurements

The CXLDK is an easy-to-use accelerometer development system. It provides a quick way to interface any Crossbow accelerometer to a PC or workstation. The CXLDK utilizes an on board 12-bit A/D, voltage regulator, and RS-232 communications port. The CXLDK is also shipped with X-VIEW (see pg. 39) graphical evaluation software for vibration, inertial, and tilt sensing applications of the CXLM accelerometer Series. The CXLDK is shipped complete with the cables, connectors, and power supply necessary to start development immediately.

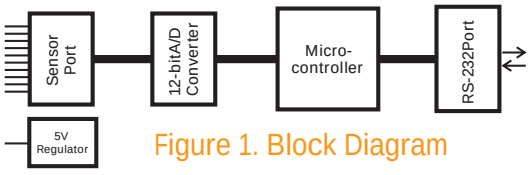


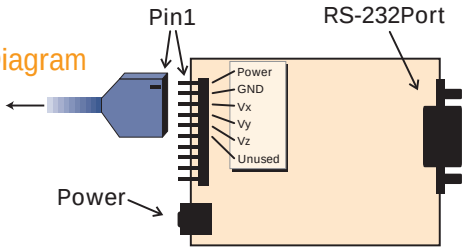
Figure 1. Block Diagram

The host PC or workstation communicates with the CXLDK via RS-232 at 38.4 Kbaud. The serial port communication interface is detailed in Tables 2 and 3. The host PC sends a request for a sample by sending an ascii 'G' (Get Data) to the CXLDK. The CXLDK responds with a packet of voltage data in the format described in Table 1. The maximum sampling rate that the board can handle is 200Hz.

X-VIEW evaluation software developed in National Instrument's LabView programming language is included. This software allows the basic properties and performance of Crossbow accelerometers to be explored. Specifically acceleration, vibration (FFT), tilt (roll/pitch), and inertial measurement are provided in the software. Writing custom software for the CXLDK is simply a matter of calling the serial I/O routines provided in standard 'C' function libraries. These routines are platform (DOS, Win, Unix) specific.

The CXLDK ships with a small DC power supply which powers the board circuitry. The power supply plugs directly into the CXLDK interface card. The CXLDK also ships with a DB-9 (male-female) cable for the RS-232 data link.

Figure 2.
Connection Diagram



ORDERING INFORMATION

Part#	Channels	Resolution	Range	U.S. Price 1-9
CXLDK	4	1mV	0-4 V	$299

Communications Protocol

Byte Number	Sensor Port Pin Number	Acceleration Axis	Function
0	N/A	N/A	Header
1	N/A	N/A	Header
2	3	X	MSB A/D Channel - 1 (0-15)
3	3	X	LSB A/D Channel - 1 (0-255)
4	4	Y	MSB A/D Channel - 2 (0-15)
5	4	Y	LSB A/D Channel - 2 (0-255)
6	5	Z	MSB A/D Channel - 3 (0-15)
7	5	Z	LSB A/D Channel - 3 (0-255)
8	6	Unused	MSB A/D Channel - 4 (0-15)
9	6	Unused	LSB A/D Channel - 4 (0-255)

Table 1. CXLDK packet structure

38.4KBaud
8 Data Bits
No Parity
1 Stop Bit
No Start Bits
No Flow Control

Table 2. CXDLK serial port settings

'R' Reset Command: An ASCII 'R' command is sent to the CXLDK in order to reset the firmware. The CXLDK immediately responds with an ASCII 'H' indicating that the CXLDK is functioning properly.
'G' Get Data Command: An ASCII 'G' is sent to the CXLDK in order to request a data record. The board responds with a 10 byte string that contains the voltage data. The meaning of the voltage data depends upon the sensor module connected to the board.

Table 3. CXLDK serial interface commands

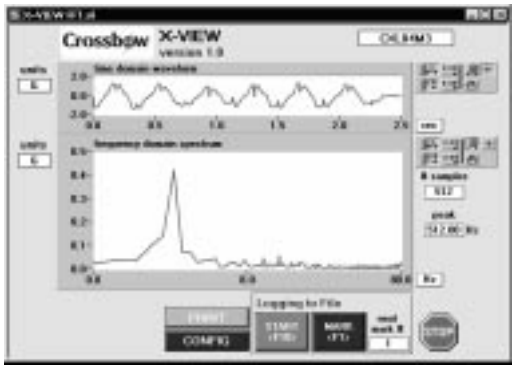
How to convert data to volts:

counts (0–4095) =
255 ✳ MSB + LSB

$$\text{volts} = \frac{4}{4095} * \text{counts}$$

Table 4. Data conversion table

X-VIEW Software: Dynamic Analysis



X-VIEW Software: Spectrum Analyzer

X-VIEW is free with purchase of CXLDK, for printing and logging upgrade to X-ANALYZE see pg. 39